CDM

Memorandum

To: *Kent Morgan - City-County Planning Department*

From: *Pat O'Neill, P.E. - CDM Project Manager*

Date: *September 12, 2006*

Subject: *Event Center and NSFP Improvements Flood Storage Evaluation - Technical Memorandum*

Introduction

The City of Lincoln (City) retained CDM to evaluate the flood storage impacts of proposed improvements at two sites along Salt Creek. Site 1, the proposed City Event Center site, is located south of the Haymarket Park baseball complex. Site 2 is located at the existing Nebraska State Fairgrounds Park (NSFP). The goal of the evaluation was to determine whether the proposed developments may be constructed without violating the allowable fill percentages as determined during the Salt Creek DFIRM Update project. Improvements at both sites involve bringing in fill to elevate proposed buildings above the base (100-year) flood elevation (BFE).

The Salt Creek DFIRM Update project included the update of both the floodplain and floodway along Salt Creek, extending from approximately Saltillo Road to the confluence of Stevens Creek. As part of the project, 20 storage areas were defined along the Salt Creek floodplain between Calvert and Superior Streets, each of which is assigned an allowable fill percentage. It is anticipated that a future City ordinance will limit the amount of fill in each storage area based on the assigned allowable fill percentages. Figures 1 and 2 show the proposed fill on a conceptual level at Sites 1 and 2, respectively. Site 1 is located entirely within Storage Area 9 (SA9), which has an allowable fill percentage of 40 percent. Site 2 is located within two storage areas, SA17 and SA15, which have allowable fill percentages of 60 and 65 percent, respectively.

Conceptual Grading Plan

Conceptual grading plans for Sites 1 and 2 were completed based on information provided to CDM by the City. At Site 1, the conceptual grading plan shows the proposed overpass elevated to cross over the existing railroad tracks. Additionally, the area bounded roughly by the proposed Arena Drive and 8th Streets, shown as Proposed Development Area on Figure 1, was elevated to 1,152.0 at the north end and 1,154.0 at the south end. At Site, 2, the proposed

grade around the buildings designated as "New" by the city was elevated to between 1,150.0 at the east end to 1,152.0 at the west end.

Flood Storage Impacts

To evaluate the flood storage impacts based on the proposed fill described above, the first step was to estimate the amount of flood storage volume currently available at Sites 1 and 2. Since Site 2 straddles two storage areas, separate analyses were conducted; one for the portion within SA17 and one for the portion within SA15. The available flood storage volume at each site was determined by calculating the difference between the estimated 100-year water surface elevation and the existing ground surface elevation. The next step in the process was to estimate the amount of fill that would be placed on the site based on the assumptions described above. Finally, the percentage of flood storage filled as a result of the proposed improvements was calculated. Table 1 presents the results of the analysis. Table 1 also includes the allowable fill percentage in each of the storage areas impacted by the proposed developments.

Table 1
Flood Storage Calculation Results at Sites 1 and 2

Site Number	*Description*	*Storage Area (Percent Allowable Fill)*	*Existing Flood Storage (ft^3)*	*Proposed Fill Volume (ft^3)*	*Percent of Flood Storage Area Filled*
Site 1	Event Center	SA9 (40)	15,389,230	4,131,780	27
Site 2a	NSFP, west side	SA15 (65)	14,039,360	233,870	2
Site 2b	NSFP, east side	SA17 (60)	10,206,160	3,186,940	31

At both sites the percent of flood storage removed as a result of the proposed improvements is less than the maximum allowable fill designation for their respective storage areas. Therefore, these projects can be undertaken as proposed in the conceptual grading plans without violating the City's proposed flood storage area ordinance. Since this analysis was undertaken with very conceptual level information, it is recommended that this analysis be repeated as the conceptual designs are refined into more detailed design. Conservation easements will need to be provided to make certain that the allowable fill standards are met for this site now and in the future.

It is also recommended due to the proximity of the concept design to Salt Creek that the conceptual design in proceeding forward incorporates Best Management Practices into the concept, such as pervious pavement, bioswales, green roofs, infiltration planters and other conservation measures to improve water quality and reduce local runoff. If incorporated early in the design these can provide cost offsets to more traditional drainage designs with underground piping.

cc: Ben Higgins – City of Lincoln, Watershed Management
Erin Ansell - CDM
Nate Garrett - CDM

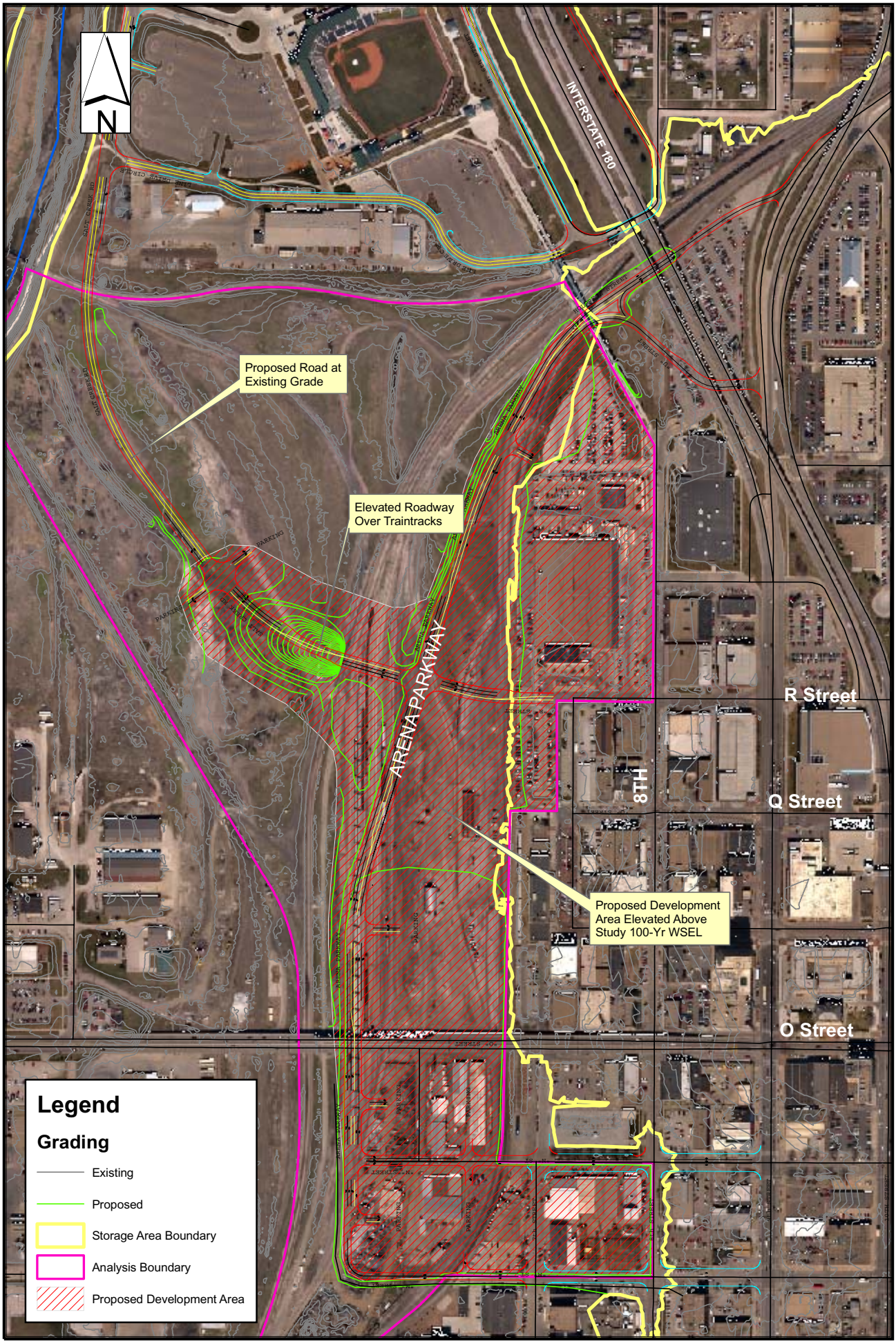

Figure 1 - Site 1 Event Center
Proposed Fill Area

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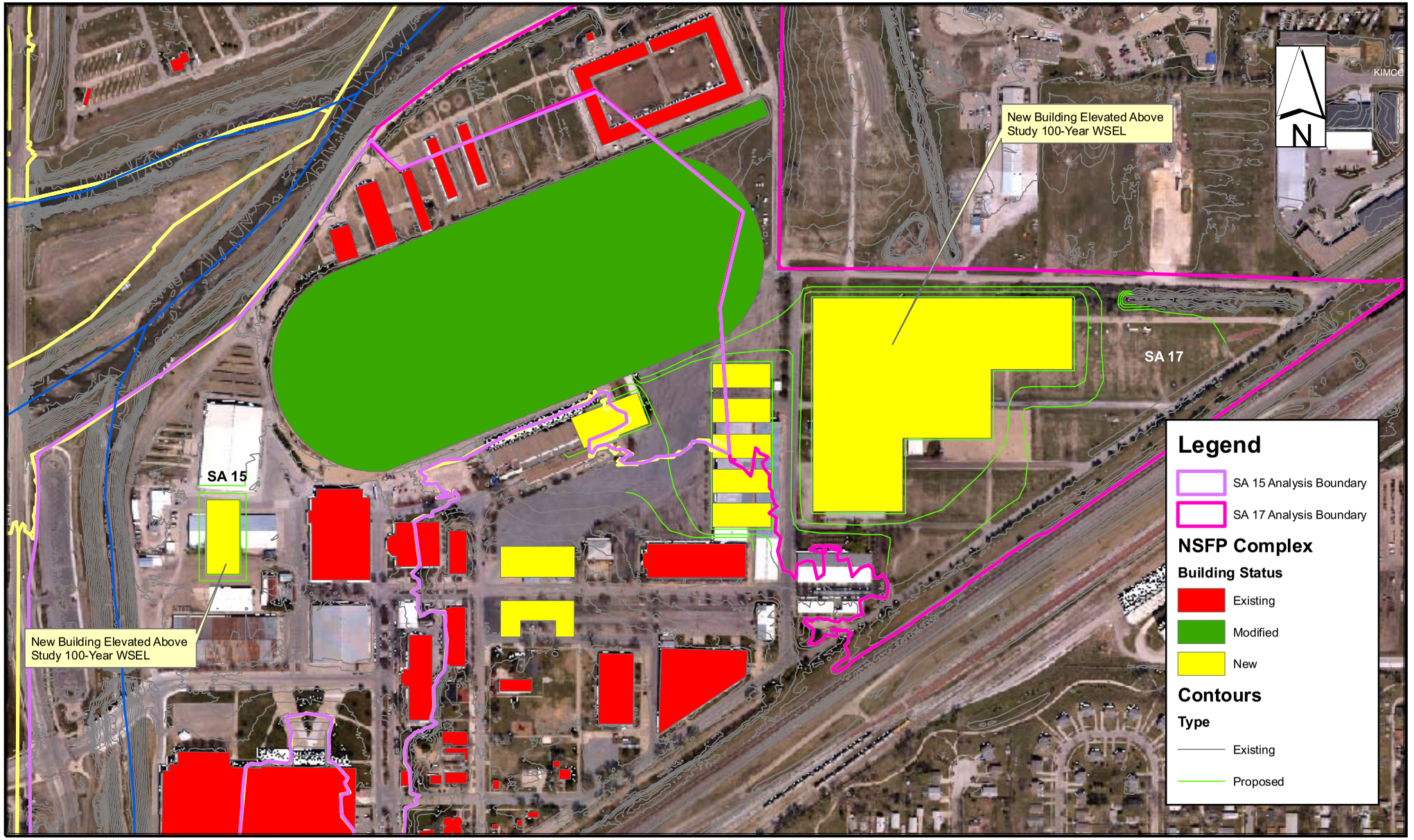

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Figure 2 - Site 2 NSFP Complex
Proposed Fill Area